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ZOOLOGY.—*Resistance to intestinal trichinosis in experimental animals induced by feeding metabolic products of encysted trichinae.*<sup>1</sup>

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Administration of vaccines by mouth has been found to be of value in some cases in the treatment of certain diseases, and in view of this, it occurred to the writer that metabolic products elaborated by trichina larvae might be used in a similar manner to produce a resistance to intestinal infestation with this parasite. Attempted immunization by injection of trichina proteins has yielded negative results.<sup>2</sup> In order to determine, therefore, whether the ingestion of metabolic products of trichina larvae would pro-

<sup>1</sup> Received October 7, 1936.

<sup>2</sup> McCoy, O. R. Amer. Jour. Hyg. 21: 200. 1935.

fect animals against infection with this parasite, carcasses of rabbits containing encysted trichinae were digested in artificial gastric juice thus liberating into the digestive fluid possible metabolic products of the larvae present within the capsules.

The digestive fluid was prepared and the digestive process carried out as outlined by Ransom.<sup>3</sup> The fluid obtained following the digestion of trichinous meat was filtered through a Mandler filter to remove all trichina larvae and coarse undigested particles; be-

TABLE 1.—RESULTS OF FEEDING METABOLIC PRODUCTS OF ENCYSTED TRICHINAE

Test No.	No. of animals used	No. of trichinae given per animal	Neutralized digestive fluid per animal (cc)		Days duration of infection	Average No. of trichinae per animal		Percentage of trichinae in test animals as compared to controls
	test and control	test and control	test	control	test and control	test	control	
1	4 rats	1,850	8 to 12	0	3	663	1,100	60.3
2	4 rats	5,200	10 to 15	0	3	3,910	4,630	84.4
3	4 rats	10,150	6 to 8	0	6	3,560	4,950	71.9
4	4 rats	10,000	50 to 70	0	4	1,750	3,300	53.0
5	4 rats	500	140 to 200	0	3	128	400	32.0
5a	2 rats	500	95 to 100 <sup>1</sup>	0	3	170	398	42.7
5b	2 rats	500	90 to 110 <sup>2</sup>	0	3	395	400	98.8
6	2 rabbits	25,000	110 to 125	0	6	5,075	12,950	39.1
7	2 rabbits	26,375	65 to 80	0	4	7,470	18,522	40.3
8	2 rabbits <sup>3</sup>	4,000	30 to 60	0	3	200		16.6
8a	2 rabbits <sup>3</sup>	4,000	30 to 60	0	3	187	1,200	15.6
9	4 guinea pigs <sup>4</sup>	555	100 to 125	0	3	220		55.0
9a	4 guinea pigs <sup>4</sup>	555	120 to 130	0	3	175	400	43.8
9b	4 guinea pigs <sup>4</sup>	555	115 to 145	0	3	400		100.0
10	3 guinea pigs <sup>5</sup>	800	60 to 80	0	3	325		54.2
10a	3 guinea pigs <sup>5</sup>	800	50 to 85	0	3	563	600	93.8

<sup>1</sup> Digestive fluid heated before feeding.  
<sup>2</sup> Fluid obtained after artificial digestion of carcass of trichina-free rabbit.  
<sup>3</sup> Two control rabbits were used in these tests.  
<sup>4</sup> Four control guinea pigs were used in these tests.  
<sup>5</sup> Three control guinea pigs were used in these tests.

fore administering the fluid, it was neutralized with decinormal sodium hydroxide, using phenolphthalein as an indicator. Rats, rabbits and guinea pigs were the host animals used in the experiments.

Both test and control animals were infected with equal numbers of trichina larvae, and the test animals were given the neutralized digestive fluid by mouth throughout the duration of the experiment; the control animals received distilled water instead of the digestive fluid.

A post-mortem comparison, made 3 to 6 days after infection, of the number of adult trichinae in the test animals with those present

<sup>3</sup> Ransom, B. H. Jour. Agric. Res. 5: 819. 1916.

in the controls was the criterion for determining whether or not a resistance had been brought about by ingestion of the digestive fluid. The technic involved in these examinations was the same as that outlined by McCoy.<sup>4</sup>

To determine whether animals would be protected from an experimental infection with trichinae by ingesting artificial gastric juice in which trichina-free rabbit meat had been digested, animals in tests 5b, 9b, and 10a were fed fluid obtained by artificially digesting uninfected rabbit carcasses. It will be noted that these animals were not protected, since they harbored practically as many trichinae as the controls that received no digestive fluid.

Ten tests were carried out and the results are summarized in Table 1. These data show that the test animals were protected to a greater or lesser extent against experimental intestinal trichinosis, since the test animals harbored only from 15.6 to 84.4 percent of the numbers of trichinae present in the controls. In tests 5a and 9a the digestive fluid was heated at 50°C for 30 minutes, and in test 8a it was heated at 60°C for 30 minutes, before administering it to the animals. As shown in Table 1, the animals which received the heated digestive fluid harbored from 15.6 to 43.8 percent of the number of trichinae harbored by the controls, showing that the immunizing principle was not destroyed by heating at these temperatures.

From the tests reported in this paper, it may be concluded that artificial gastric juice in which trichinous meat has been digested contains a substance capable of protecting to a certain extent, rats, rabbits, and guinea pigs from an experimental intestinal infection with trichinae. This protective substance is associated with the presence of trichinae, and is not destroyed by moderate heating. Additional investigations of this problem are in progress.

<sup>4</sup> McCoy, O. R. Amer. Jour. Hyg. 21: 200. 1935.